formed in a depth equal to or greater than a depth of the trench whereby each of the metallic layers and the drift layer are operative to act as a Schockley diode.

12. A method of manufacturing a silicon carbide semiconductor device, comprising the steps of:

preparing a first or second electrically conductive type substrate made of 4H silicon carbide and having a surface on one of a (000-1) c-plane and a (0001) Si-plane;

forming a drift layer on the substrate with the first electrically conductive type silicon carbide having a lower impurity concentration that that of the substrate;

forming base regions on the drift layer by ion-implanting a second electrically conductive type impurity in given positions from a surface of the drift layer;

forming source regions using the first electrically conductive type silicon carbide with a higher concentration than that of the drift layer by ion-implanting a first electrically conductive type impurity on surface layer portions of the base regions in areas within the base regions, respectively;

forming a trench-gate forming trench in an area penetrating a surface of the drift layer to-pass through the source regions and the base regions to reach the drift layer and including a sidewall having a surface extending in one of a [11-20] direction and a [1-100] direction;

forming deep-layer forming trenches in areas spaced from the trench-gate forming trench each by a given distance and each having a depth equal to or greater than the depth of the trench-gate forming trench;

infilling the deep-layer forming trenches with second electrically conductive type deep layers each with a higher concentration than that of the base regions;

forming a gate oxide film over a surface of the trench-gate forming trench by thermal oxidation;

forming a gate electrode on the gate oxide film in the trench-gate forming trench;

forming a first electrode electrically in electrical connection to the source regions; and

forming a second electrode on the substrate at a rear surface thereof.

13. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, wherein:

the base regions are formed on the drift layer by epitaxial growth.

14. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, further comprising the steps of:

forming channel layers on the drift layer by allowing n-type layers to be formed by epitaxial growth before forming the gate oxide film over a surface of the trench-gate forming trench.

15. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, wherein:

the base regions are formed in a plurality of positions; and

the trench-gate forming trench is formed between the base regions in an area spaced from the base regions by a given distance and has a depth greater than those of the source regions and the base regions from the surface of the drift layer while having the sidewall laying on the surface extending in one of the [11-20] direction and the [1-100] direction.

16. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, wherein:

the step of forming a trench-gate forming trench and the step of forming deep-layer forming trenches allow the trench-gate forming trench and the deep-layer forming trenches to be simultaneously formed.

17. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, further comprising the steps of:

forming reserve layers with a concentration lower than those of the deep layers by ion implanting a second electrically conductive impurity onto bottom walls of the trench-gate forming trench and the deep-layer forming trenches before infilling the deep layers after forming the trench-gate forming trench and the deep-layer forming trenches.

18. The method of manufacturing the silicon carbide semiconductor device according to claim **12**, further comprising the steps of:

the step of forming the drift layer comprises forming first electrically conductive type low resistance regions in areas deeper than the base regions with the drift layer having a high concentration; and

the step of forming first electrically conductive type low resistance regions comprises forming the low resistance regions each between of the trench-gate forming trench and each of the deep layers.

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